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AIR COMMAND AND STAFF COLLEGE

AIR UNIVERSITY

TAKING ADVANTAGE OF EXTERNAL FUNDING FOR AIR FORCE OFFICER PH.D. CANDIDATES AT CIVILIAN UNIVERSITIES

by

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A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

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Contents

Abstract

In order to fill billets requiring Advanced Academic Degrees (AADs), the Air Force routinely sends officers to complete doctoral degrees at AFIT and at civilian institutions. The Air Force typically fully funds the tuition and other costs incurred at civilian universities, constraining an officer's choice of universities due to budgetary restrictions. The 3-year time limit typically imposed by the Air Force for degree completion further restricts the number of universities that an officer can consider, since typical doctoral programs require significantly more time to complete. This paper argues that the Air Force could save money while simultaneously opening up a wider selection of universities to its officers by making targeted policy changes that would better align its practices with those of American higher education. First, the Air Force should routinely encourage officers to apply for fellowships and assistantships to pay for their tuition—the majority of doctoral students in the U.S. win such sponsorship. Second, the Air Force should relax the 3-year time limit, simultaneously waiving the requirement for doctoral candidates to hold a master's degree. This report considers these proposed changes within the historical context of graduate education in the Air Force and current practices in civilian doctoral programs.

Introduction

Over the history of the Air Force and at all levels of leadership, graduate education has been recognized as fundamental for the professional development of Air Force officers. Today, virtually all Field Grade Officers (FGOs) possess graduate degrees – a qualification which has become an unwritten requirement for promotion. A more select group of officers obtain doctoral degrees in order to fill Advanced Academic Degree (AAD) billets requiring a Ph.D. Many of these billets exist for educators at AFIT, USAFA, ACSC, and AWC, but other billets also exist to ensure that key positions are filled by highly competent subject matter experts.

The Air Force Institute of Technology (AFIT) and the Naval Postgraduate School (NPS) are the primary sources of technical Ph.D.s among Air Force officers. For degrees not offered at either of these schools, the Air Force sends its officers to civilian institutions. In doing this, the Air Force usually pays the officer's tuition in full. The officer remains on active duty, collecting his/her full salary while accumulating time in grade and advancing toward retirement. Sponsoring a student for a Ph.D. is an expensive investment for the Air Force, whether funding a student at AFIT or at a civilian institution.

With such an expenditure of resources for graduate education, one should make the most of this investment. Ideally, Air Force officers sent for civilian education would enroll in top academic programs, where exacting standards and the level of their peers would challenge them to excel. Furthermore, it would be advantageous for the Air Force to sponsor students at a wide selection of universities, allowing the Air Force to benefit from a broader network of ideas, training, and contacts. The Air Force would also benefit from the credibility that comes from having officers with graduate degrees from top programs. To appreciate this point, one has simply to look at the press coverage of GEN David Petraeus, which constantly trumpets his

Princeton doctorate as a reason to respect his views.[1] Would they be as excited about how smart they think he is were his degree from a lesser-known school?

There are two main obstacles, however, that severely limit the choice of civilian programs for an Air Force-sponsored degree. First, the Air Force typically imposes a three-year time limit for the entire doctoral program. Three years is the norm at AFIT, where the program is designed to support this restriction. Doctoral students at European universities, whose programs so focus on research that coursework requirements are minimal-to-nonexistent, often finish their degrees in three to four years. Civilian institutions in the U.S., however, typically impose considerable requirements for coursework and qualifying examinations, in addition to the central requirement of significant original research. A typical U.S. Ph.D. program in the physical sciences or engineering consists of about two years of classes and qualifying examinations, followed by three or more years of full-time research. Air Force-sponsored officers who fail to complete their degrees within this three year window are usually removed from school and immediately reassigned. They risk being passed over for promotion unless they can quickly complete their research and/or writing *in absentia*. With these risks in mind, most officers are limited to programs where the coursework and qualifying exams are not overly demanding, and where they can find an advisor willing to accept the limited amount of research that can be accomplished within the three year window.

The second obstacle that restricts program choice is the limited Air Force budget for tuition at civilian universities. Current policy holds that the Air Force will not pay for tuition in excess of about $19,000 per year.[2] This tuition cap is greater than the *average* tuition-per-student that the Air Force can afford. With typical annual graduate tuition at private schools in the range of $30,000 to $45,000, many top programs are ruled out based simply on cost.

As a result of these time and cost limitations, the majority of Air Force-sponsored officers wind up attending a very limited subset of available schools. These schools are chosen for their relatively low tuition and for their acceptance of the three year time limit—for some schools, receiving tuition in full from the Air Force (as opposed to supporting another graduate student through an assistantship) provides a reason to cooperate. Highly competitive programs, flush with research money and talented applicants, have little incentive to alter their standard operating procedures to accommodate Air Force needs.

How to overcome these obstacles of cost and time in order to provide the Air Force with access to top programs? The argument of this research paper is that the Air Force can take advantage of existing fellowship and research/teaching assistantship opportunities in order to allow officers to attend programs costing more than the Air Force tuition cap. According to a survey of doctorates earned in 2006, the majority of full-time doctoral candidates are funded primarily through fellowships and assistantships.[3] The Air Force could take advantage of these monies to fund its own degree candidates, would it but systematize a mechanism by which officers could compete for and accept these awards.

To help make officers competitive for these external sources of funding at top schools, the Air Force needs to reconsider its self-imposed three-year time constraint for degree completion. As discussed above, this policy is out of step with the mainstream of American graduate education. The Air Force is understandably concerned about "loss of use" of the officer undergoing schooling, and wants to minimize the time an officer spends in school. The solution to this problem may lie in addressing another out-of-step Air Force policy – that of requiring one to earn a master's degree before a Ph.D. Earning a Ph.D. directly from a bachelor's degree is (or is becoming) the norm in many fields. In many cases, earning a master's degree will simply

slow a student down on their way to a doctorate. Allowing an officer 4 or 4.5 years for an externally funded doctoral program (bypassing the master's degree) could save the Air Force both money and service time lost to schooling.

This research paper will begin by providing an overview of how the Air Force currently funds graduate degrees. This discussion will consider the need for officers with graduate degrees, the history of degree sponsorship within the Air Force, regulations governing current practice, and the utilization of officers with graduate degrees within the Air Force. Next, the paper will consider important aspects of civilian doctoral programs; specifically, graduation requirements, typical completion times, and the availability of funding for graduate students. Finally, proposed changes to current Air Force policy and practice for graduate degree sponsorship will be described, and an analysis made of the concomitant risks.

Overview of Graduate education in the Air Force

The need for graduate education

International society has long recognized the value of higher education for its workforce. As described by Becker in his seminal work on "human capital" theory,[4] an employer who invests in education for employees can expect their productivity to increase as a result. Furthermore, "higher education creates benefits to society above those to the individual—benefits in terms of growth, social cohesion and the transmission of values, and the transmission of knowledge for its own sake."[5] Barr warns, however, that "quantifying those benefits … faces a series of difficulties, not least because it is hard to separate the effects of education from other determinants of a person's productivity."[6]

In discussing employer-sponsored education, Becker draws a distinction between "general" and "specific" training.[7] In this context, general training is that which provides skills

or knowledge that would benefit any likely employer. Specific training, by contrast, is training or education whose application is primarily of interest to the employer providing the training, with limited applicability elsewhere. According to Becker, an employer providing general training for an employee is not as likely to reap the benefits of the employee's resultant increase in productivity as in the case of specific training. The employee, whose increased knowledge and skills warrant greater compensation than before, may seek employment elsewhere. Despite these risks, however, "employer-financed general training is quite common."[8]

The Air Force provides its enlisted corps with a significant amount of specialized training, according to career specialty, via technical schools. Officer training, however, tends toward the "general" category. Examples of this include Professional Military Education (PME) schools such as Air War College (AWC) and Air Command and Staff College (ACSC), as well as Defense Acquisition University (DAU) courses. While one could argue that these schools focus on Air Force-specific needs, significant portions of officer professional education focus on general skills such as leadership, management, and writing. Graduate degrees, whether sponsored at AFIT or at civilian institutions, provide training that is almost entirely general in nature. The Air Force, therefore, needs to carefully consider the risk involved with officer retention when it sponsors officers for graduate school, as well as seek to mitigate these risks via sound policy.

Given the highly technological nature of Air Force missions, its leaders have traditionally placed greater emphasis (*i.e.*, funding) on graduate education in science and engineering than on the social sciences and the humanities. The prevailing perception is that, as managers of activities that rely on the development and acquisition of complex and technologically advanced equipment that will operate in air, space, and cyberspace, the officer corps needs to be well

versed in the technical disciplines. At various times in Air Force history, leaders have believed they were facing an "engineering shortage," even going so far as to sometimes offer continuation incentive pay to scientists and engineers.[9] The majority of Air Force officers with technical graduate degrees obtain them through fully-funded programs (about 80% in both 1970[10] and 1977[11]). Many officers earn degrees through part-time programs (*e.g.*, with tuition assistance from the Air Force), but the majority of these are in non-technical fields such as "international studies or the social sciences."[12] An examination of the numbers in 1970 makes it easy to understand why the Air Force would feel the need to train and retain officers with technical degrees. The physical and social sciences provide an illustrative comparison. In the social sciences, for 517 AFIT-sponsored master's degrees, there were 513 degrees obtained through tuition assistance and over 1500 independently obtained degrees. In the physical sciences, for 684 AFIT-sponsored master's degrees, there were 15 degrees earned using tuition assistance, and 205 independently obtained degrees. These figures highlight the fact that degrees in science and engineering do not lend themselves to part-time study, nor are they easily obtained with long gaps between schooling. It is not surprising, therefore, that the Air Force would make significant investment in full-time education in engineering and the sciences. By contrast, it is somewhat surprising that, despite the great numbers of officers who can (and do) independently obtain master's degrees in business and the social sciences, the Air Force sponsors about as many fully-funded master's degrees in these fields as it does in science and engineering.[13] By contrast, the overwhelming majority of officers earning doctoral degrees while on active duty do so in full-time programs, for both technical and non-technical fields.

In recent years, calls have been made for greater emphasis on "cultural" awareness in professional military education.[14] This emphasis on the need for most (if not all) officers to have

a basic background in international relations, cultural studies, and foreign language skills can be attributed to recent military challenges in Iraq and Afghanistan. Coupled with recent budgetary cuts in acquisition programs for high-tech platforms, this emphasis on cultural awareness has created a climate where the 'pendulum' in military education is swinging a bit away from the technical and focusing on the value of education in general. This new focus has resulted in changes in PME curricula (*e.g.*, the inclusion of language training as part of ACSC). Additionally, senior Air Force leadership has a renewed interest in ensuring that Air Force-sponsored education is of the highest possible quality. One example of this is the recent inquiry of AF/A1D by the Air Force Chief of Staff, General Schwartz, as to why more officers are not sponsored for degrees at top-tier universities.[15]

The Importance of Quality

If a renewed emphasis on education will contribute to solutions for the challenges currently faced by the U.S. military, surely the quality of that education will matter. PME schools are contributing to the educational needs of military officers, but they are limited in what they can provide. In the words of Vitas, "professional military education -- from West Point to the senior schools and war colleges – is not sufficient to develop officers cognitively able to deal with these new nonmilitary tasks without compromising military professionalism. The depth of insight and inquiry needed is best found in civilian liberal arts graduate education, in contrast to technical and scientific graduate degrees."[16] While anyone who has survived (or not survived) a class in statistical mechanics might judge as laughable his implication that scientific education lacks "depth of insight and inquiry," his point that the most rigorous education in many fields might be offered outside of the military is well taken. He goes on to offer some possible reasons that PME schools do not match up well against top civilian universities: "frequent curriculum

changes prevent a high level of sophistication in instruction or faculty," "there is little opportunity for in-depth thought … among faculty and students," and "senior service schools also possess few distinguished scholars, perhaps because of a systematic discouragement of thinkers in uniform."[17] Vitas argues that civilian universities can offer "a diversity of behavior and views,"[18] and that "civilian graduate education should be retained as much for the integrative effects of exposure to civilian elite groups as for the academic discipline."[19]

Similarly, AFIT cannot hope to compete with civilian schools of science, engineering, or management in terms of breadth of faculty experience, span of the curriculum, or "depth of inquiry." Reasons for this include the three-year time limit for Ph.D. completion (or 18 months for a thesis-based master's degree), the intense focus on "operational impact,"[20] and a faculty heavily staffed with active and retired military officers. Limited time for program completion limits the type and depth of research that can be undertaken. This time limit impacts not only the students, but also the military faculty who, themselves, were similarly limited when they obtained their Ph.D.s. Being "operationally" focused is AFIT's *raison d'être*. AFIT's graduate programs concentrate on projects with direct relevance to the Air Force mission—an obvious strength from an operational perspective. From an institutional perspective, however, one might wish to cultivate a number of officers with a more diverse educational experience by sending them to the very best civilian universities. As stated in a report from the Army War College, "graduate education in civilian institutions forces the military officer to move into the mainstream of America."[21] From a technical point of view, interacting with peers and faculty engaged in the full spectrum of scientific research can be an enriching experience in terms of the ideas that can be brought back to the Air Force technical community, and can help to foster personal relationships beneficial to both the individual and the Air Force.

It's important to note that the faculty at AFIT does, of course, recognize the need for diversity, and is doing its best to assemble a top-flight faculty. A perusal of AFITs website[22] reveals a large fraction of the faculty to hold a degree from AFIT itself—fully *one third* of the faculty in the Engineering Physics department hold a Ph.D. from AFIT. Despite what would be a surprisingly "inbred" faculty for a civilian institution, some of the military faculty members *have* been sponsored at civilian institutions for their doctoral degrees. Not many of the military faculty hold terminal degrees from top-tier institutions, however—doubtlessly for the reasons discussed above.

Costs to the Air Force

Fully funding a graduate student for a doctoral program at a civilian institute represents a very significant investment. The major cost to the taxpayer, however, is not the tuition. Unlike most graduate students, active duty Air Force officers receive their normal salary and benefits while at school, which is a much greater cost (even for a Second Lieutenant) than tuition. Students sponsored in-residence at AFIT also require this support: "these costs, rarely incurred in civilian educational programs, account for much of the difference between Air Force program costs and those of civilian institutions."[23] Civilian institutions are generally more economical than AFIT, even when the comparison is limited to AFIT's "tuition equivalent" costs: "tuition and fees cover only 30 percent of the total cost per academic year in a civilian institution … the largest part of the cost of civilian higher education is covered by state and federal appropriations and by grants, endowments, and other contributions."[24] Of course, economies of scale permit AFIT to lower its per-student cost by raising enrollment, partially offsetting the cost differential with civilian institutions.[25] This is one factor giving rise to a natural tension between the desire to sponsor officers for degrees at civilian institutions and the need to send them to AFIT.

Another contributor to this fiscal tension is the fact that faculty at AFIT, like their counterparts at civilian institutions, rely on research grants to accomplish their educational missions. Both the number and quality of students are major determinants as to what kinds of research projects can be undertaken and what amounts of funding can be won, since graduate students perform the bulk of the work involved with research.

Selection of Students

Civilian graduate students are largely self-selected; *i.e.*, they choose their field of study and the school they will attend, limited mainly by the competitiveness of their academic background and their budgetary constraints. According to a former Chief of Staff of the Air Force, Gen John Jumper, Air Force graduate students should be selected based on mission needs: "education must be tailored to benefit Airmen in doing their jobs."[26] Furthermore, Air Force graduate students need not concern themselves with the means to pay for their education: "[The Air Force] will provide the right development venues to meet both Airmen and Air Force needs."[27]

Practice falls a bit short of these Socialist-sounding ideals, however. In the case of PME, the Air Force has a long tradition of mandating a "one-size-fits-all" education for the bulk of its officer corps. Given the broad and high-level nature of these programs, it is possible for virtually everyone to succeed (as defined by the Air Force) in PME studies, be they willing participants or not. For more advanced and specialized training, Air Force-imposed education is less likely to be effective. It is difficult to obtain a doctoral degree in any field without a keen interest in one's subject of study, since the effort required is exacting and long. Furthermore, there are restrictions as to which officers can be put into which programs of study, based on individual academic background and talent. Someone without a strong background in mathematics, for

example, cannot be expected to complete a doctorate in the physical sciences or engineering. While some have called for AFIT to "[identify] non-volunteers" for technical degrees since "not enough officers were volunteering to support a high-quality program,"[28] volunteers predominate in today's AFIT, especially at the doctoral level.

Another limiting factor to the freedom of the Air Force in selecting officers for graduate education is the strength of an officer's past academic record. Grades, GRE scores, and past research experience are typically important factors for university admissions, which could potentially preclude officer applicants from attending certain schools. AFIT offers the Air Force direct control of admissions and post-matriculation performance standards, within the limits imposed by accreditation requirements. In this manner, the Air Force can ensure that a maximum of students are admitted and complete their academic programs in a timely manner. AFIT's "desired GRE scores are 500 verbal and 600 quantitative or higher for a Masters Degree program and 550 verbal and 650 quantitative or higher for Doctoral programs."[29] A comparison of these master's-level admission standards with national data for all GRE examinees (most not yet matriculated) shows these scores to be just below and somewhat above average for the quantitative and verbal portions, respectively.[30] The AFIT standard for the quantitative portion of the GRE, however, is well below the average of examinees with the expressed intention of pursuing a graduate program in engineering or the physical sciences.[31]

Admission standards at an institution of higher learning can have a significant influence on the educational experience it offers. As Braxton writes, "the folklore of higher education … holds that institutions with more selective admissions have higher academic standards and thus higher quality academic programs … such folklore is not without some empirical support."[32] Classes entirely composed of highly talented students permit educators to delve more deeply into

a broader range of material, and to hold students to higher standards of performance both in the classroom and in research. In graduate school, where having more talented students can equate to an increased ability to win research grants, the most talented faculty gravitate toward schools with the most demanding admissions standards. For the most academically talented officers, top-tier civilian institutions can offer a challenging alternative to AFIT.

Officer Retention

It makes little sense for the Air Force to invest in the higher education of its officers if it does not retain those it pays to educate. A 1972 Air Force study found that "retention for AFIT resident graduates was twice that of AFIT civilian institution graduates."[33] The study committee advanced the hypothesis that this was, in part, "because the students were on an Air Force base wearing their uniforms, their membership in the Air Force was constantly reinforced."[34] Furthermore, some "fear that civilian education for military personnel could have a contaminating effect, causing some to stray from the path of duty."[35] Vitas writes that after education at a high-quality civilian institution, "some become so dissatisfied with the military and its intellectual constraints that they resign – the military can no longer fulfill their expectations."[36] One possible contributing factor to this phenomenon is the greater marketability of a degree from a top-tier civilian institution, which offers its holder wider options than those with an AFIT degree. Outside of military circles, AFIT is not particularly well-known—it does not appear among the best graduate schools of engineering or management in popular rankings such as those published by *US News and World Report*.[37] Another factor may be related to self-selection. While some programs are automatically sponsored at civilian schools because the field of study required by the Air Force is not offered at AFIT, other students are sent to civilian schools for other reasons. Faculty "pipeline" training programs (that prepare officers to serve on

the faculties of Air Force schools, including AFIT itself) deliberately seek to sponsor candidates at schools other than AFIT, in order to provide their schools with the quality and credibility that comes with diversity in faculty education. It may be that candidates who compete for sponsorships at civilian schools may have a greater tendency to do so with their post-military future in mind, as compared to students who make no active effort to avoid attending AFIT.

Historical Context

In the early 20th century, advanced education was a greater rarity in American society than has become the norm today, even among the middle class: "graduate degree holders are estimated at 3 percent of the professional and managerial white collar workers of the time."[38] Apart from faculty pipeline programs for the faculties of military academies, the military had no formal systems for the fully funded graduate education of its officers.[39] The custom of allowing graduating military academy cadets to accept external scholarships for graduate studies began prior to World War II.[40] In 1920, Congress authorized the Services to sponsor graduate degree programs for its personnel: "The Secretary of the Army is hereby authorized to detail personnel … without regard to component, as students at such technical, professional or other civilian educational institutions … as shall be best suited to enable such personnel to acquire knowledge or experience in the specialties in which it is deemed necessary that such personnel shall perfect themselves … At no time shall more than 8 per centum of the authorized commissioned officer strength … be detailed as students pursuant to the provisions of this paragraph."[41] A similar law passed in 1948 stipulated similar language regarding the Air Force, with the same officer enrollment limit of 8 percent.[42]

The Air Force Institute of Technology, as it is currently known, began as a small Army aeronautical school, established in 1919.[43] It evolved over the years to meet the perceived needs

of the Army, then the Air Force after its divestiture from the Army in 1947. A 1949 report from the Air Force Scientific Advisory Board, known as "The Ridenour Report," recommended that AFIT "be converted into a graduate school of engineering to serve the needs of the Air Force."[44] Two main justifications offered were 1) "the availability of research facilities, … [the like of which] were simply not available at civilian universities …would greatly enhance an Institute graduate program" and 2) "research to be done under the Institute resident program had no equivalent in civilian universities."[45] In 1950, the USAF Military Education Board echoed the call for further development of AFIT's graduate education programs, but warned that "resident studies should not duplicate civilian institution programs, as this was unnecessary and could jeopardize continuation of the Institute."[46] It wasn't until 1956 that legislation granted Air University the right to award degrees to graduates of AFIT—the first graduate degrees were awarded in 1958.[47]

Subsequent Air Force studies of AFIT's role in providing graduate education for officers continued to view AFIT as providing complementary capacity to that of the civilian institution program. The report of the 1956 USAF Educational Conference predicted that AFIT needed to "review its capacity to handle an increased resident program (*to accommodate officers not accepted into civilian institutions*) [emphasis added]."[48] The report from a follow-on conference in 1959 recommended that the Air Force "review entrance requirements to make sure they were not unrealistically high."[49] In 1963, the Air University Plan for the Development of Air Force Professional Education described the need to increase capacity at AFIT "to support needs that could not be met in civilian schools," even though "the Air Force would need to continue relying on civilian institutions for courses of study that were not Air Force-unique."[50]

The highly critical 1970 report by the U.S. General Accounting Office (GAO), "Improvements Needed in Determining Graduate Education Requirements for Military Officer Positions"[51] marked a traumatic moment for graduate education programs in the Armed Forces. The report slammed the Services for failing to justify the need to routinely fund the graduate education of their officers. Where the Services claimed to have specific position-related needs for graduate degree holders, the GAO countered that these needs were not sufficiently justified, and that civilians with graduate degrees were preferable to officers for such positions. The GAO suggested that the Services ought to focus on providing short, as-needed courses for officers filling positions requiring specialized training. The Department of Defense, given the opportunity to comment on the draft report, criticized the GAO's "failure to acknowledge: a) the rising educational aspirations of the segment … from which we must recruit … b) the value of graduate education in our … retention efforts [and] c) the increased capability which an officer with graduate education brings to billets ... outside of … positions validated for his academic credentials."[52] The unfavorable nature of this report was a major contributor to a sharp decline in the number of military officers sponsored in fully-funded education programs—a 56 percent decrease between 1973 and 1981.[53]

This GAO report provoked a number of reports,[54,55] studies,[56] theses,[57] and articles[58,59] examining various aspects graduate education in the military during the 1970s. A follow-up GAO report in 1974,[60] for example, found that the Army and Navy continued to fund full-time graduate education for officers without validated billets requiring these degrees. The Air Force fared well in this report, having undergone a "position-by-position survey of AAD requirements"[61] in 1971 and 1972. The 1969 establishment of the Air Force Education Requirements Board (AFERB)[62] had perhaps given the Air Force a head start on correcting the

billet validation problems. AFERB was created to review and approve advanced academic degree (AAD) billets, as well as forecast future Air Force AAD requirements in coordination with career field functional managers.[63]

The warning in 1950 from the USAF Military Education Board that AFIT's existence might be threatened if its capabilities overlapped with those of civilian institutions was prescient. In 1997, the Secretary of the Air Force, Sheila Widnall announced the decision to close AFIT and transfer its students into civilian institution degree programs.[64] AFIT, with help from Ohio's congressional delegation,[65] was successful in having this decision reversed after Secretary Widnall's departure.[66] To further protect AFIT's security, Air Force Secretary James G. Roche signed an agreement with the Navy to send Air Force personnel to the Naval Postgraduate School (NPS) for graduate education in meteorology.[67] In return, more Naval personnel would attend AFIT for degrees related to aeronautics: "by working together, we hope to minimize redundancy at each institution."[68] With AFIT's need to defend its existence, the Air Force continued its move away from the historical view of AFIT as existing to provide degree programs that could not be found at civilian institutions. Present-day Air Force policy requires that officers attend AFIT in-residence if AFIT offers the required degree. Exceptions are made, in some instances, for faculty pipeline sponsorships, where the desire exists for diversity in sources of graduate degrees.

Air Force Practice and Air Force/DoD Regulation

Air Force degree sponsorship programs must operate within the bounds set by regulation. Department of Defense Instruction 1322.10, *Policy on Graduate Education for Military Officers*, lays out overarching guidelines for the Services:[69]

> 4.2. Graduate education programs shall be established to:
> 4.2.1. Raise professional and technical competency, and develop the future capabilities of military officers to more effectively perform their required duties and carry out their assigned responsibilities.
> 4.2.2. Provide developmental incentives for military officers with the ability, dedication, and capacity for professional growth.
> 4.2.3. Develop or enhance the capacity of the Department of Defense to fulfill a present need, anticipated requirement, or future capability.

Among these justifications for military graduate education, the first and third seem quite obvious—increased officer competency and the ability to meet specific needs (in an engineering specialty, for example) clearly benefit the Services. The second reason offered, however, describes another role for graduate education, that of an "incentive." The most obvious personal incentives to many are increased promotion potential and higher earning capacity in future civilian employment. The latter incentive was cited by a 1959 report from the USAF Educational Conference as a primary consideration in crafting Air Force policy. According to the report, effective policy should seek to "entice non-career officers to seek an Institute education to further their civilian career goals."[70]

The desire for career progression as measured by promotion and earnings potential, however, is not always the main focus for officers desiring a Ph.D. For some, curiosity, a passion for a particular field of study, and the desire to take on intellectually rewarding challenges are the principal motivators. Testing the hypothesis that "in making these choices, students attempt to maximize the present value of lifetime earnings," Yoram Weiss found that a

desire for money could not explain why the most capable graduate students (as measured by entrance criteria such as grades and standardized test scores) would choose to study physics: "Taking into account the differences in ability, … the high rate of entry into physics and the low rate of entry into social sciences [is] somewhat puzzling from the pecuniary point of view."[71] In crafting its policies on graduate education with a view to acquiring needed skills and optimizing officer retention, the Air Force should bear in mind that a desire for intellectual stimulation and personal growth can be primary motivators, especially among the most intellectually capable officers.

DOD Instruction 1322.10 describes three main methods for funding officer graduate education:[72]

> E2.1. Fully Funded. While pursuing a graduate degree, the military officer receives full pay and allowances, with the majority of the tuition and other schooling costs being assumed or paid by the U.S. Government or by another organization. The officer attends school instead of performing usual military duties.
>
> E2.4. Partially Funded. While pursuing a graduate degree, the military officer receives full pay and allowances with the majority of tuition and other schooling costs paid by the officer from personal funds and/or benefits to which the military officer was entitled. The officer attends school instead of performing usual military duties.
>
> E2.5. Unfunded Education. While pursuing a graduate degree, the majority of tuition and other schooling costs are paid by the officer from personal funds and/or benefits to which the officer was entitled. The officer attends school during off-duty time.

The first category, "fully funded," is typified by attendance at AFIT, the Naval Postgraduate School, or a civilian institution. In all three cases, the Air Force pays for the officer's tuition or the equivalent costs at residence schools. At residence schools, doctoral programs are designed for completion in no more than 3 years, and require a master's degree for entrance.[73] At civilian institutions, Ph.D. programs are typically limited to 3 years. The reason for this limitation appears to be mostly financial—the school billets approved by the AFERB come with three attached man years.[74] As mentioned previously, the decision to send an officer to AFIT/NPS vs.

a civilian institution mainly rests on whether or not the residence schools offer a degree in the required field of study. It is not uncommon for individual officers to prefer civilian institutions to AFIT. Possible reasons for this include the prestige of a particular civilian school, the desire to better position oneself for a post-Air Force career, and the broader personal development that some may seek in a traditional university environment. This choice between AFIT and civilian schools can be a significant factor in determining the incentive value (a DOD goal, as discussed above) of graduate education programs. This fact was recognized by the Air Force Systems Command Ad Hoc Group on Updating S & E (Science and Engineering) Competency in their 1966 report. While discussing "direct accession" graduate school sponsorships for recent AFROTC graduates, the group noted that "[requiring] … ROTC graduates … to attend AFIT resident programs rather than having an option to apply to a civilian institution … [was seen] as a disincentive."[75]

In addition to privately funded, off-duty education, "unfunded education" includes (in a seeming misnomer) degrees earned through tuition assistance benefits.[76] Pell Grants can be used in conjunction with personal funds and tuition assistance provided by the Services.[77] Another source of unfunded degrees comes from the Educational Delay ('Ed Delay') program, whereby newly commissioned officers from AFROTC can apply to the Air Force for permission to delay entry onto active duty in order to pursue graduate or professional studies. If the officer has "completed academic work for award of a master's degree,"[78] the Air Force limits the approved delay to 2 years. If the officer plans to directly earn a "doctorate degree without award of a master's degree," a delay up to 4 years can be approved.[79] This deviation from the standard "three years for a doctorate" apparently caused some consternation for the policy's authors, even though these degree candidates cost the Air Force no money in tuition or salary: "Applicants for

doctorate degrees who bypass a master's degree program must provide a complete explanation. … Applicants must clearly state their desires on the bypassed master's program in case the doctorate program is denied. When no master's program is offered, a confirming statement from a school official is required."[80] Apparently, the concern is that if a candidate fails to obtain the doctoral degree, they should at least obtain a master's degree.

The second category of funding from DOD Instruction 1322.10 is "partially funded." The officer remains on active duty and collects a normal salary, but the Service does not pay for tuition, other than through normal "benefits." It is interesting to note that the use of personal funds for tuition is explicitly included as a permitted option. The Air Force, however, does not permit its officers to pay for their own tuition while in full-time school, other than as part of the Operation Bootstrap program. "Bootstrap" provides officers with the opportunity of up to one year of permissive TDY in order to complete a degree full-time.[81] The officer must, through part-time schooling (using tuition assistance or other funding) be within one year of degree completion to take advantage of this program. The author is aware of at least one officer who obtained his Ph.D. using the Bootstrap program, piggy-backing this final year on top of schooling completed previously under a Fellowship program.

Air Force Instruction 36-2302 allows for the acceptance of external monies for tuition and fees in a graduate program.[82] This provision has several restrictions, including:

> 3.4.3. The total period of AFIT education plus time spent in a fellowship, scholarship, or grant program under this regulation must not exceed 54 consecutive months with an approved extension.
> 3.4.5. Permission to accept a fellowship, scholarship, or grant is usually not given unless:
> 3.4.5.1. The monetary grants associated with the award cover the cost of tuition and related fees.
> 3.4.5.2. The recipient of an award certifies that an amount that is more than the cost of sending the officer to the same school at government expense will not be accepted.
> 3.4.5.3. The period of education, training, or research is ordinarily 2 years or less for masters programs and three years for PhD programs.[83]

Additionally, "the recipient of the award [must be] a winner of a competition in which the member was authorized to compete."[84] Officers are not, therefore, simply free to compete for and win external funding for graduate school. AFI 36-2302 also requires that "HQ AFPC AFIT Selection Board determines, in advance, eligibility, availability, and suitability of the applicant"[85] and that "HQ USAF/DPDE [determine] the eligibility of the donor."[86] This program does not currently receive man years from the AFERB and, apart from possible exceptions the author is unaware of, is defunct for active duty officers.[87] The US Air Force Academy (USAFA), on the other hand, is granted considerable autonomy in selecting cadets to accept external scholarships,[88] and is given the man years necessary for the sponsorship of dozens of cadets per year. Examples of approved monies include Draper Fellowships, Marshall/Rhodes Scholarships, Truman Scholarships, and Hertz Foundation Scholarships. Obviously, these scholarships are not within the reach of most cadets or active-duty officers, due to keen competition. In virtually all cases, these scholarships for USAFA cadets lead to master's degrees, not doctoral degrees. The Air Force lacks a systematic procedure for capitalizing on available outside monies for the graduate school sponsorship of top candidates, even though current regulations permit the acceptance of such funds.

Utilization of Advanced Degrees in the Military

The need for officers to earn advanced degrees and the manner in which the taxpayer funds these degrees have been continued topics of debate. It is fundamentally difficult to quantify the benefit of graduate education: "determining the optimal investment … in graduate education … is nearly impossible."[89] Attempts to measure the effect of graduate education on job performance have sometimes yielded counterintuitive results, such as Chamberlin's findings that officers without graduate degrees in logistics management demonstrated better job

effectiveness than those with equivalent civilian institution graduate degrees.[90] In another study, Zwart found that "marginally scholastic" (*i.e.*, poor students) graduating from the Air Force Institute of Technology had similar career progression to that of their more academically proficient classmates.[91] In this case, at least, the results seem to belie the apparently logical expectation that if education increases the worth of an officer, then the quality of that education should contribute to the degree of this effect. A 1973 report from the Office of the Assistant Secretary of Defense, in reviewing industry sponsorship of the graduate education of employees, concluded that companies made these investments "based on general faith in the benefits of education rather than on specific identification of needs."[92]

"Faith-based" justification for educational investments notwithstanding, the Air Force has systematized the identification of personnel billets requiring a graduate degree. Air Force Instruction 36-2302 details the process by which needs are identified and prioritized.[93] Unit reports on advanced academic degree (AAD) needs flow up through the MAJCOMs to the Air Force Education Requirements Board (AFERB), which then approves and prioritizes these requirements.[94] Functional experts known as Air Force Academic Specialty Monitors (ASMs) are appointed as advocates to "defend AAD quota requirements for their particular degree specialties at AFERB Working Group," and to "track execution of quotas/man years."[95] USAF/DPDE "serves as chair of the AFERB Working Group" and is the approval authority for exceptions to the policy that "officers selected to complete graduate education will complete this education in-residence at AFIT."[96]

The effect that earning a graduate degree has on an officer's career is another area of concern, both for the Services and the individual officer. The officer, obviously, wants to be rewarded with continued promotion as long as he/she stays in the Service. The Service itself, on

the other hand, has little interest in making a large educational investment in an individual that will be forced out of the Service due to non-promotion. In one study of Navy officers, it was found that fully-funded graduate degrees had an overall positive effect for promotion and selection for command.[97] Pearson[98] and Chae,[99] in assessing the promotability of Air Force and Army officers, respectively, point out the difficulties of attributing promotion success to the education itself when selection for graduate education is based on pre-existing potential and demonstrated performance. A 1983 study of Air Force Academy graduates "revealed the negative effect attaining a PhD has on the promotability of Academy graduates to colonel."[100] In general, it appears that the prestige of being selected for a Ph.D. program and the attached service commitment carry most military officers to the grade of Lt Col. The time spent in school puts one at a disadvantage relative to peers as far as military experience, however, contributing to the negative bias of a Ph.D. on one's chances of attaining the rank of Colonel.

Promotion potential is an important factor in post-school retention. So is the timing of schooling in an officer's career. Three years of graduate school, followed by five years service required for degree "payback," mean that officers starting their Ph.D. programs as newly promoted Captains will be taken to the 12 year point in their career, over halfway to a 20-year retirement. As Hanushek points out, "virtually nobody desires to depart the military after 10 years of service."[101]

In order for the Air Force to reap the maximum benefit from the increased skill and knowledge gained by an officer while earning a Ph.D., such education should come as early as possible in an officer's career. Early education would also permit an officer to avoid the stigma of losing, due to time spent in school as a senior Captain or Field Grade Officer, valuable "military" experience. One study concluded "that attaining a Ph.D. early in one's career and in

the shortest possible time in order to devote the remaining service time to more "visible" military endeavors would be career enhancing."[102] Vitas argues that officers should "[start] civilian graduate education earlier,"[103] since "civilian graduate education at the seven-year mark in an officer's career does not have a profound effect on his basic attitudes."[104]

In addition to the intellectual benefits of early education in one's career, the Air Force stands to pay less for the education of a Lieutenant than that of a Major. A 1986 study described tuition costs as "relatively minor" when compared to the "the salary and benefits … the officer receives while attending full-time schooling."[105] One possible drawback to sending newly commissioned officers straight to graduate school for a Ph.D. is captured in observations made in 1970 that "retention rates were lower among advanced degree holders of eight years service or less"[106] and "officers attending AFIT programs very early in their careers had a lower retention rate than did older officers."[107] Perhaps civilian career opportunities, enhanced by the possession of an advanced degree, tempted officers to leave the Air Force before they had invested much time toward retirement.

Of course, for the Air Force to benefit from specialized training, officers sponsored for graduate degrees need to serve in a billet requiring the degree they have earned. In speaking of the Army, Braudrick wrote that "in order to effect "payback," two hurdles must be made—MILPERCEN placing the officer on orders to an AERB assignment, and the local commander actually placing the officer in a validated position and leaving him there for the duration of the tour."[108] The failure to employ officers in an AAD billet after having obtained a graduate degree was one of the major complaints of the 1970 GAO criticism of the Services.[109] According to Hanushek, "the relationship between degree attainment and utilization shows an amazingly large proportion of individuals who do not work in a field related to their training."[110]

Perhaps underutilization of degrees is another contributor to the relatively low retention for younger officers with graduate degrees. Hoskins writes: "Studies on perceived overqualification, overeducation, and match quality suggest that utilization plays a role in an individual's job satisfaction and organizational commitment. Job satisfaction and organizational commitment levels can be used as predictors of turnover."[111] An officer who is willing to undergo years of rigorous schooling in a specific subject likely has a passion for that subject, and may resent not being utilized in a field to which the degree is pertinent.

Civilian Graduate Education in the United States

Degree requirements for the Ph.D. vary in the details among various civilian institutions and departments. There are, however, broad commonalities for these requirements among U.S. institutions. In what follows, the broad strokes of typical doctoral programs will be described, with specific examples provided from departmental descriptions of degree requirements at the Massachusetts Institute of Technology (MIT) and Harvard University—two examples of top-tier institutions.

A typical Ph.D. program involves about two years of full-time coursework, followed by full-time research: "The first year or two of study is normally a probationary period, during which … students will be devoted to … study of the literature, taking formal courses … , learning research and experimental techniques, … and beginning to teach and do research. After being admitted to candidacy, students devote essentially full-time to completing the dissertation research ... Preparation of the dissertation usually occupies one to three years."[112] A little arithmetic shows this rosy description to bound doctoral programs as taking between two and five years. The lower bound is virtually unheard of, as tacitly acknowledged later in the same report: "the time taken to complete a doctoral degree is considerably longer than the traditional

period of four to five years."[113] Total time spent earning the doctorate for degree recipients in 2006 averaged 6.7 and 7.9 years in the physical and social sciences, respectively.[114] The figures for engineering and the humanities were 6.9 and 9.7 years, respectively.[115]

Rates for successful completion of the Ph.D. vary widely by institution and department. Studies consistently show, however, that students in the physical sciences have higher completion rates than those in social sciences or the humanities.[116] Some of this difference may be due to fundamental differences in how degree requirements and research are organized: "Programs in the humanities are usually less structured, providing multiple options for completing requirements and more independent study. At the dissertation level especially, students in the physical sciences doing their research in a laboratory have ready access to faculty help, are monitored, and interact regularly."[117] Research in the physical sciences is necessarily collaborative, requiring frequent communication with one's advisor, fellow graduate students, and other researchers.

Research funding may be another major factor in differences in completion rate and time to degree. Table 1 shows the percentage of students receiving financial support from various

	Physical Sciences	Engineering	Social Sciences	Humanities
Teaching assistantships	25.3	8.9	23.3	33.5
Research assistantships/traineeships	46.6	61.3	16.6	2.3
Fellowships/dissertation grants	21.3	19.3	27.4	33.3
Own resources	4.2	5.2	29.7	28.1
Foreign government	0.9	1.7	1.2	1.3
Employer	1.7	3.5	1.7	1.5
Other	0	0	0	0.1

Table 1. Primary financial support of doctoral degree recipients in 2006, expressed as a percentage of graduates.[118]

sources, according to 2006 Survey of Earned Doctorates.[119] The majority of students in physical science and engineering received primary support from research assistantships. These

assistantships are typically given by one's faculty advisor, using money the advisor receives from a research grant. The advisor is required to make regular reports to the funding agency (be it governmental or industrial) on the progress of the research, and possibilities of future funding are heavily dependent on the research results. This being the case, the advisor is highly motivated to see positive progress in the student's research. While a student may be primarily responsible for one aspect of a research project, post-doctoral researchers, fellow graduate students, undergraduates, and the faculty advisor are often directly involved with related aspects of the overall project, and dependent (both intellectually and financially) themselves on the student's results. With such interdependencies, a student will not often be permitted to languish alone in unfruitful research or laziness. Reliance on the research assistantship, therefore, may also explain the observation that "the Natural Sciences tend to lose their students early, while other divisions continue to lose students even after a decade of study."[120] Students who underperform run the risk of having their funding cut, leading to withdrawal from school—as shown in Table 1, funding one's own studies is uncommon in the physical sciences and engineering.

Written and/or oral qualifying exams are typically administered either during or immediately after the initial years of coursework. Data on success rates for these exams is hard to come by, since it varies widely by department. A rough upper bound for the failure rate can be inferred from a study involving 10 universities across various departments, which found that "the probability of achieving second-year status was 87 percent; the probability of achieving ABD status given second-year status was about 80 percent; and the probability of achieving the Ph.D. given ABD status was 81 percent."[121] Presumably, to achieve "all but dissertation" (ABD) status, students must have passed their qualifying exam(s)—from the above figures, the ultimate

pass rate cannot be lower than about 70%. Of course, this "ultimate" pass rate might have involved multiple attempts at the exam(s). Overall, of students who enroll in Ph.D. programs, the numbers given above imply that about 56% of them will earn their degrees.

The earning of a master's degree is not always a prerequisite for the doctorate. This is proven by the significant numbers of doctoral recipients either without a master's degree or without a master's degree related to their doctoral studies. Of U.S. citizens receiving doctoral degrees in 2006, only 48.6% and 62.6% of them earned related master's degrees in the physical sciences and engineering, respectively.[122] How many of these degrees were earned simply "on the way" to the doctorate, without any additional course or thesis requirements, is not listed.

In many top departments, it is both possible and encouraged to enroll directly into the Ph.D. program, without a prerequisite master's degree. MIT's political science master's and Ph.D. degrees, for example, are viewed as *separate* degree paths: "All applicants interested in a PhD in Political Science should apply directly to the PhD program whether or not they have a master's degree. Students who are accepted into the master's program in Political Science at MIT typically do not continue on for a PhD. Many of our PhD students do not have a master's degree."[123] In the MIT physics department, master's degrees are virtually non-existent, except as a consolation prize for an aborted Ph.D. program: "The normal degree program in the Department leads to a Ph.D. in Physics. Only in special cases … are students admitted to pursue a Masters degree in Physics. Sometimes a student admitted for a Ph.D. may … fail the General Exam. In these cases the student may be able to satisfy the requirements for the Masters degree."[124] Similarly, the Harvard Department of Government does not accord master's degrees much importance: "The graduate program of the Department of Government is designed to train students for careers in university teaching and advanced research in political science. The

department does not offer an independent master's program …"[125] The master's degree is not generally required for admission into top-tier doctoral programs, and going out of one's way to earn one can actually increase the total time required to earn a doctoral degree.

Proposed Changes to Air Force Policy and Practice

Current Air Force practice for Ph.D. sponsorship is out of step with how civilian universities run their doctoral programs. The three-year time limit for degree completion and the failure to routinely take advantage of fellowships and research assistantships lead to limited choices in civilian doctoral programs. The Air Force mindset that a master's degree is a requisite step towards a doctoral degree can also lead to missed opportunities. Appropriate changes to current policy and practice could open greater access to top doctoral programs while saving money.

First, the Air Force should consider allowing officers a fourth year to complete their doctoral programs. This would benefit the Air Force and the sponsored officers in two main ways: 1) making officers more attractive as candidates in top-tier departments and 2) reducing the risk of failing to complete their programs of study within the allotted time. The author is personally aware of cases where civilian institutions rejected officers for admission based largely on the lack of interest in a candidate who would have barely a year to perform full-time research after completing coursework and qualifying exams—hardly sufficient time to make meaningful scientific progress in most cases. This disinterest might seem shocking in view of the fact that the Air Force was offering to pay full tuition, something that most research advisors must usually pay out of their own research grants, as explained above. Air Force officers are potentially quite tempting to a research advisor from a financial standpoint, since they do not require (nor can they accept) the stipend inherent in most research assistantships. That faculty would often prefer

to pay a civilian student both full tuition plus a stipend rather than accept a free officer with a three-year time limit is damning evidence of how current Air Force policy is far afield. Of course, the further down the academic and financial pecking order one goes, the more likely that Air Force money will persuade an advisor and his department to support a three-year Ph.D. program. Competitive departments, rich in research grants, can afford to pay for students who will be able to devote the average 4-5 years to full-time research after two initial years of courses and qualifiers. Thus it is that doctorates from top-tier institutions remain a rarity among Air Force officers, many of whom would have been quite competitive for admission as civilian students to any university in the country.

By dropping the requirement for doctoral candidates to first have a master's degree, the Air Force could even extend the permitted length of a doctoral program to 4.5 or 5 years. This total time spent in grad school would not represent an increase over the total time spent by many graduate students at AFIT's residence program, which is designed around a 1.5 year master's degree, followed by a 3 year Ph.D. It is often far easier to take graduate classes, pass qualifying exams, and do research as part of one continuous doctoral program than to negotiate transfer credit for master's courses taken at a different institution. Incidentally, master's courses taken at one school may not be good preparation for qualifying exams taken at another, and breaking graduate school into two separate pieces can increase the risk of failure at the doctoral level.

By allowing officers to directly pursue a doctoral degree (*sans* master's degree) and thereby permitting more time for the doctoral program, the Air Force would make them much more competitive for external fellowships and research assistantships. While it is true that civilian student would still offer an advisor significantly more productive time (7-8 years on average for the Ph.D., as discussed above) than an officer, the officer would still be significantly

cheaper than a civilian student, due to the lack of stipend. This compensating virtue would not only help officers bring in external tuition money at civilian schools in general, but could also make them more tempting to top-tier programs.

To maximize the benefits of using external funding for tuition, the Air Force will have to change its mindset of "if we are sending you to school to fill an Air Force requirement, we are obligated to pay your tuition" to one of "we will give sponsorship priority to officers who can secure external funding for tuition." The view that graduate education is simply an advanced form of externally imposed "tech training" is too narrow—not only should graduate school serve a broader role in expanding one's intellectual horizons, but the individual officer has a strong personal interest in both what and where he/she is to study: "since this advanced education benefits individuals by increasing their lifetime earnings potential, it should at the very least be possible to shift part of the cost of training to the individual."[126] Instead of allowing officers to accept external funding on a cases-by-case basis, the Air Force should publish a list of acceptable sources of external money, and encourage any officers who desire to attend graduate school to compete for these funds. Only where requirements cannot be met through externally funded applicants should the Air Force feel obligated to pay tuition—it should be recognized, however, that students unable to secure external sponsorship likely have academic qualifications below the average of their civilian competitors, most of which will be successful at securing fellowships and assistantships.

Some may protest that 4 to 5 years of continuous schooling, as proposed above, remove officers from the Air Force for too long, thus compromising their growth as Air Force officers. The first complaint ignores the nature and value of doctoral training, which is not simply advanced training beyond the master's degree, but an intentionally lengthy period of deep

reflection that permits the student to make original contributions to a field of research. To attempt to chop that experience into PME-equivalent pieces is to fundamentally change its nature, and lowers the bar on what is expected from an officer's doctoral research. If an Air Force billet truly requires an officer to hold a doctorate, then Air Force leadership should not shy away from accepting what is required to train a bona fide Ph.D. While it is beyond the scope of the current study to fully address AFIT's in-residence programs, this logic would also argue that AFIT should consider creating a 4-to-5-year Ph.D. program that does not require a master's degree. This would permit an uninterrupted focus on doctoral-level research. The continuous production of 3-year Ph.D.s from AFIT raises questions as to rigor when compared to the average of about 7 years spent by engineering students at civilian universities.

Others may be concerned (as quoted earlier) that an extended period spent on a civilian campus might lessen an officer's commitment to a full-length military career, either due to the increased marketability of a non-AFIT degree or dissatisfaction with the Air Force after seeing the "outside." If the latter is a valid concern, rather than trying to keep its officers fenced in and brainwashed, the Air Force should focus on ensuring the proper utilization of its officers with Ph.D.s. Research shows that using (and valuing) someone for what they've been trained to do contributes to job satisfaction.[127]

As far as "commitment" to a career is concerned, current regulation on active duty service commitments (ADSCs) would ensure that officers completing a 4.5 year Ph.D. using external funding would have an obligation to stay into the service well beyond the critical 10-year threshold. According to AFI 36-2107, completion of a graduate program funded by a scholarship, fellowship, or grant carries an ADSC of 3 years for every 1 year of school.[128] This stands in stark counterintuitive contrast to Air Force-funded programs for which the "payback" is

capped at 5 years for a doctoral program.[129] Officers who begin an externally funded Ph.D. program in their first year as a Second Lieutenant and complete their program in 4.5 years would not be eligible to separate until the 18-year point. Under this construct, there would be no "flight risk" for allowing early schooling. Sending officers for their doctoral studies as early as possible offers two main advantages: 1) the Air Force enjoys the use of a Ph.D.-level officer sooner and 2) the Air Force pays less for the salary and benefits of the officer during this "non-use" period of schooling. By sending more Lieutenants and junior Captains to school using external funding, money would be saved on both tuition and salary.

Conclusions/Recommendations for Further Research

Current Air Force policy and practice in its sponsorship of doctoral candidates fails to take full advantage of the plethora of scholarships, fellowships, and research assistantships used by the majority of students at civilian universities. The Air Force is hampered by its self-imposed 3-year time limit in which officers must earn a Ph.D. Additionally, the Air Force view that a master's degree is a necessary step towards a Ph.D. is out of step with current practice at top-tier civilian schools. Allowing 4 to 5 years for a continuous doctoral program (one that by-passes the master's degree) would enable officers to effectively compete for research assistantships and other forms of outside funding. This would lead to monetary savings for the Air Force, and result in more officers earning degrees at top-tier universities. Additionally, a lengthier, continuous period of study would permit officers to more fully benefit from a more in-depth educational experience, as well as make more meaningful contributions to research. Having a greater *continuous* (not overall) time spent in school will also increase an officer's chances of successfully completing a Ph.D. Interestingly, evidence also shows that being

"beholden" to a research advisor via an assistantship can help to shorten a student's time spent in graduate school, not lengthen it.

To more fully predict the impact of implementing these recommended policy changes, further study is required. Relevant questions include:

- How many students does the Air Force send to civilian institutions?
- What schools do Air Force students attend, and what subjects do they study?
- At what rate do Air Force students successfully complete the doctorate?
- How do the academic qualifications of Air Force students compare to those of students at civilian schools? To those of students at top-tier schools? To those receiving external funding?
- What are the legal processes used to determine which external funds may be accepted?

Answering these questions will require active participation of personnel at AFIT, AU, AFPC, and the Air Staff, who own the relevant data and whose experience could provide valuable insights. Implementing eventual changes to policy would most certainly require buy-in from these same organizations.

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